

Exploring Continuity and Change: the History of the Bicycle



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A Prezi DBQ
Using Resources from the
Smithsonian Bicycle Collection

**A.S. Wieners with 1887
Rudge Racing bicycle
(about 1887)**

Your Assignment

1. Focus on the details - What am I looking at? What materials were used? How were bicycles propelled and steered?
2. Compare different bicycles - construction, design, features, uses? What things do they share in common? How do they differ?
3. Make your own decision about how bicycles changed over time and how they stayed the same.
4. Decide on a way to share what you learned with someone else.

Full teacher's guide
http://peterpappas.blogs.com/copy_paste/2010/09/analyzing-history-bicycle-prezi-dbq.html

Chain-driven safety bicycles make cycling more popular

Let's go back in time

High Wheel Bicycle

High Wheeled Safety Models

Early models - the Walking Machine and Velocipede

Adults use other new types of transportation. It's the era of the kid's bike!

At the 19th century closed, the bicycle industry began a rapid decline. However, between 1900 and 1920, the popularity of bicycle increased. One reason for this was that many people were interested in the new safety bicycles. Another reason was that the bicycle was a cheap and easy way to get around. By the next 20 years, the bicycle was used mainly by children.

20. Snyder boy's bicycle (1927)



21. Schwinn girl's Panther bicycle (1933)



22. Schwinn Varsity bicycle (1940)



23. Schwinn Super Deluxe bicycle (1945)



cycling today

time

High V

Early models - the Walking Machine and Velocipede

shrouded in
credit its
But it's clear that
the early 1800s.

In 1817, Charles, Baron von Drais, of Swabia, Germany, made a vehicle with a frame capable of being sprung over. He also gave it a padded saddle and an arm in front of his body, which helped him push against the ground.

1. Hobby horse (1818)



- Main frame - It is a wooden bar with iron forks to hold the wheels.
- 17 light wooden wheels.
- Moved by adjustable saddle.
- Padded seat with rest for the rider's feet.
- 24" wooden wheel with one inch iron tire.

In the 1860s, the "Hobby Horse" (also known as the velocipede) became popular in France and England. "Hobby Horses" were used and soon many riders were seen on the streets of Paris and London.



2. "Johnson's Pedestrian Hobby Horse" Riding School in London (1813)

3. Laubach velocipede (1869)



- Two separate iron frames, one for each wheel, meet at the center.
- The wooden seat rests on a coil spring, that can be adjusted up/down.
- The 36" wheels have 800 handbars (spokes) which are used for steering.
- The pedal cranks are attached to the front wheel, and can be adjusted to add one inch of length for riders leg.

4. Detail from flyer advertising the Lallent velocipede (1869)



5. Velocipede (1869)



The velocipede was a popular mode of transport in the 1860s. It was a simple machine with two wheels and a seat. The rider sat on the seat and pushed the machine forward with their feet. The velocipede was used for recreation and for short-distance travel. It was a precursor to the modern bicycle.

... and kick-stand.

The origins of the bicycle are shrouded in mystery. It is not possible to credit its invention to any one person. But it's clear that the first "ancestors" of the modern bicycle were in use by the early 1800s.

In 1817, Charles, Baron von Drais, of Sauerbrunn Germany, made a vehicle with a front wheel capable of ... it a padded saddle, and an

use by the early 1800s.

In 1817, Charles, Baron von Drais, of Sauerbrun Germany, made a vehicle with a front wheel capable of being steered. He also gave it a padded saddle, and an armrest in front of his body, which helped him push against the ground.

1. Hobby horse (1818)

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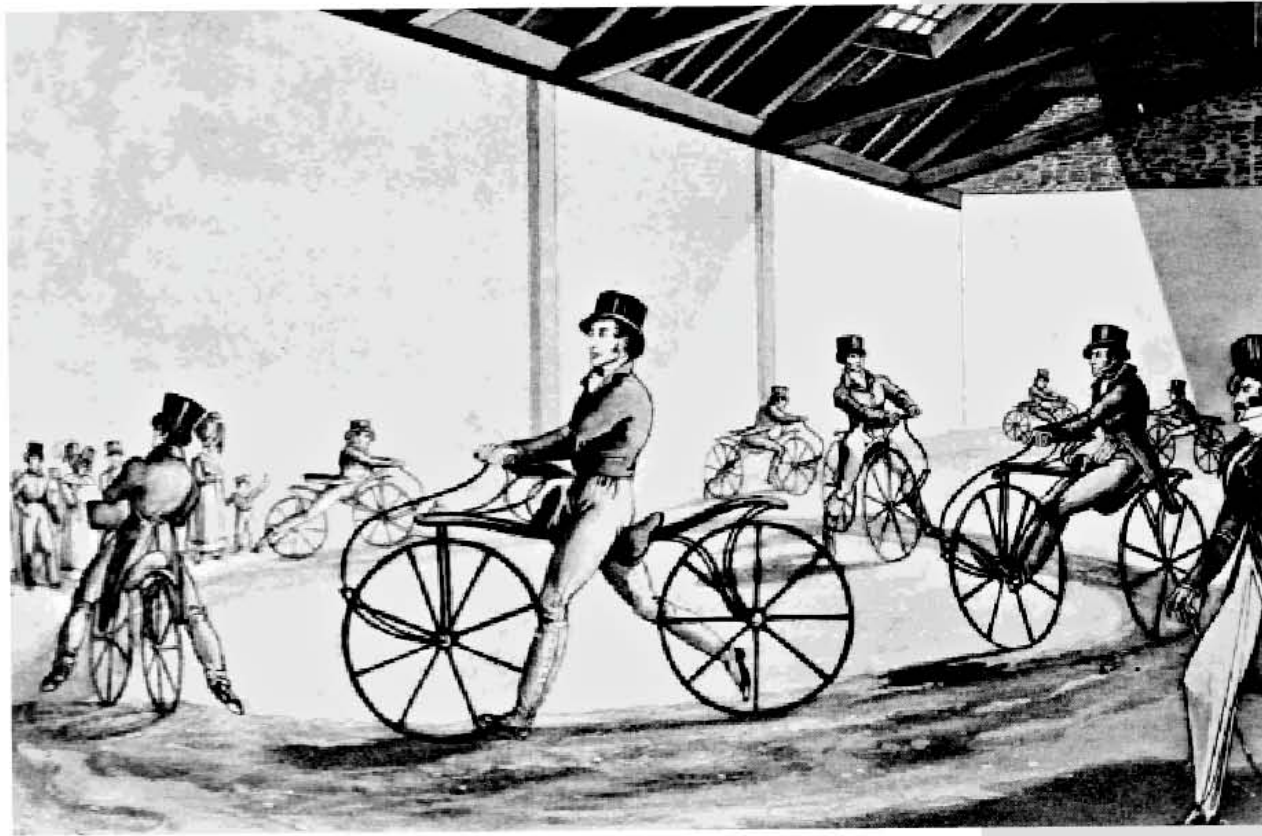
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http://americanhistory.si.edu/ONTHEMOVE/collection/object_264.html

- Main frame - 4 ft wooden bar with iron forks to hold wooden wheels
- Height adjustable saddle
- Moved by walking and coasting
- Padded seat with rest for the rider's forearms.
- 24" wooden wheels with one inch iron tires.

In the 1860's, the "Hobby Horse" (also known as the velocipede in Paris) became popular in France and England. "Riding academies" were created and soon many riders were seen on the streets of Paris and London.



2. "Johnson's Pedestrian Hobby Horse Riding School in London" (1819)

3. Laubach velocipede (1869)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_270.html

- Two separate iron frames, one for each wheel, pivot at the center.
- The wooden seat rests on a coil spring, that can be adjusted up / down.
- Turning the wood-grip handlebars causes wheels to turn for steering.
- The 36" wheels have iron tires.
- The pedal cranks are attached to the front wheel, and can be adjusted to add one inch of length for riders leg.

4. Detail from flier advertising the Lallement velocipede (1869)





5. Velocipede (1868)

- Also known as a “Boneshaker” because of its rough ride
- A metal forged frame with footrests in front for coasting
- Iron fork, topped by a handlebar mounted in brackets, swivels to steer
- Wood-spoke wheels with 1” wide iron tires. Wheels: 37” front, 31” rear
- Bronze pedals with cranks on front wheel, adjustable from 4” to 7”.
- Twisting the handlebars winds up a cord which presses a brake shoe against the tire of the rear wheel.
- A padded metal saddle is mounted on a long flat steel spring, adjusted forward or backward according to the length of the rider's legs.

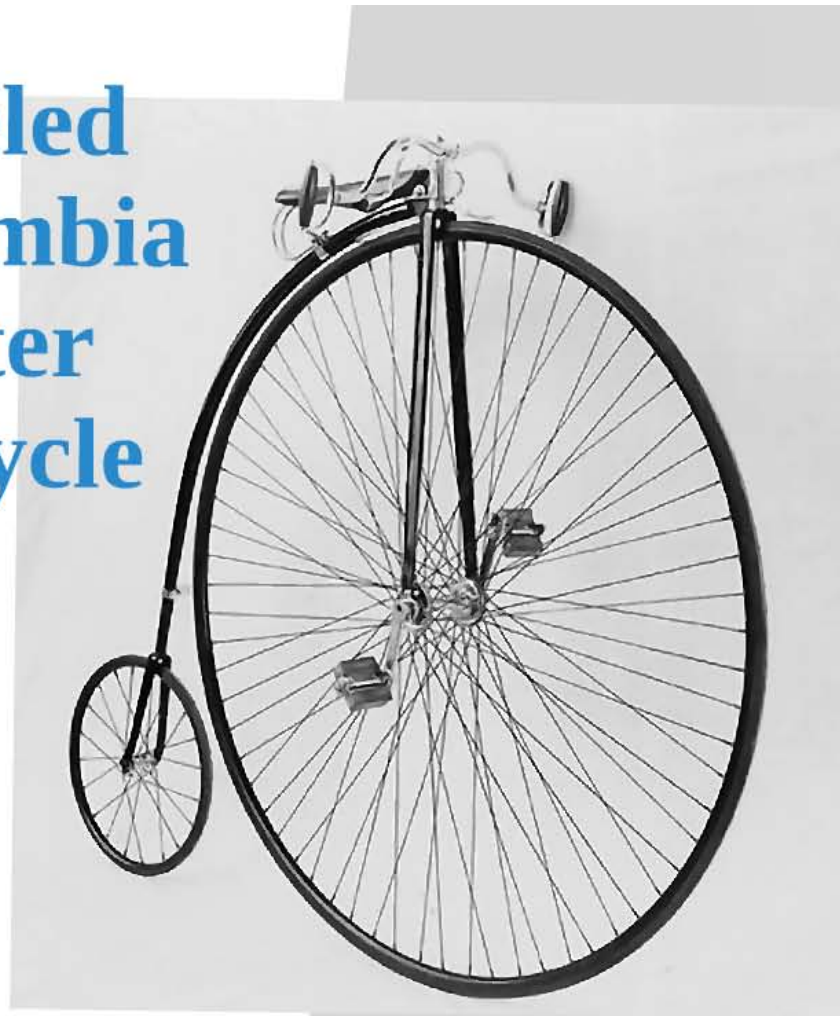
Soon Americans became interested in the velocipede. By early 1869, a number of carriage builders were making them. Many riding schools were created in eastern cities, and the sport of riding became suddenly popular, especially among the students of Harvard and Yale Universities.



**6. A velocipede riding school (1869)
from The New York Coach-Maker's Magazine.**

By the early 1870s, high-wheel bicycles and tricycles using wire-spoked wheels were commonly seen. This type of cycle, with modifications, gained popularity and later became known as an “Ordinary” in the 1890s.

8. High wheeled bicycle Columbia Light Roadster ordinary bicycle (1888)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_267.html

- Also known as a Penny Farthing - after two British coins of different sizes
- 53-inch front wheel, and 18-inch rear wheel.
- The tapering frame is made of 1 1/4-inch tubular steel. A step for mounting is located on the left lower side.
- The adjustable cranks are attached directly to the front axle, provide a throw of from 5 to 6 inches. The pedals are rubber covered.
- A friction brake, operated by the rider's right hand, works against the tire of the front wheel.
- A leather saddle suspended on springs.

7. The man riding a 1882 Columbia Expert with boy. Both wear bicycle club member uniforms (Date unknown)



The Ordinary, or high-wheel bicycle, was light weight and fast. The larger the wheel, greater the distance traveled in one rotation of pedals. They were available in different sizes with front wheels typically ranging between 4-6 ft in diameter for adults. Riders bought the highest wheel that their legs could operate.

The "Ordinary," or high-wheel bicycle, was very dangerous. The rider's center of gravity was only slightly behind the front wheel and the rider could easily fly forward.

This common accident happened when the front wheel struck something in the road, or when the brake was applied too quickly, causing the rider to be thrown head-first onto the road ("take a header") as his cycle tipped over forward. Serious injury, and occasionally even death, resulted.

Partially because of the "Ordinary's" height, few women rode them, yet there were some who not only rode, but even became known as racers. Soon, the costume of both men and women was modified to suit the sport.

trick riders

Bicycle racers and trick riders

9 . Annie Sylvester was a noted trick and fancy rider in (1885)



10. A.S. Wiener with 1887 Rudge Racing bicycle (about 1887)



Because of the "Ordinary's" danger, efforts were made to design a safer bicycle. One change was to reduce the size of the large wheel. Designers tried to make up for the loss of speed by using indirect-drive methods as chains, levers, or other mechanical devices. The rider's center of gravity was also shifted slightly backward.

In the United States, one of these early efforts produced the well-known "Star" bicycle, which had the large wheel in the rear, driven by treadles instead of pedals. This design eliminated the danger of taking headers, and became relatively popular, though it never approached the popularity of the "Ordinary."

High Wheeled Safety Models

Wheeled
Smith
(1891)



It has a solid rubber tire, is 23 inches in diameter, mounted on springs to a spoon brake to press against the rear tire, when the pedal levers rise, to either of two positions on the levers to provide two



Wheels have metal rims with solid rubber tires. Front wheel: 25" Track of the rear wheels is 29" wide. Turned by leather straps wound on the clutches and attached to pedal levers when the pedal levers rise. The straps provide two driving ratios. The front wheel is connected to a friction brake that rubs against the tire on the front wheel and is secured over the rear of the front wheel.

from Harper's Weekly (1886)



11. High Wheeled Safety bicycle: Smith Pony Star (1891)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_294.html

- The front wheel, fitted with a solid rubber tire, is 23 inches in diameter.
- The rear wheel is fitted with a 40-inch-diameter single-tube pneumatic tire.
- Adjustable leather saddle, mounted on springs
- A right hand brake connected to a spoon brake to press against the rear tire.
- The rear wheel is turned by leather straps wound on the clutches and attached to pedal levers. Springs rewind the straps when the pedal levers rise.
- The straps can be easily attached to either of two positions on the levers to provide two driving ratios.

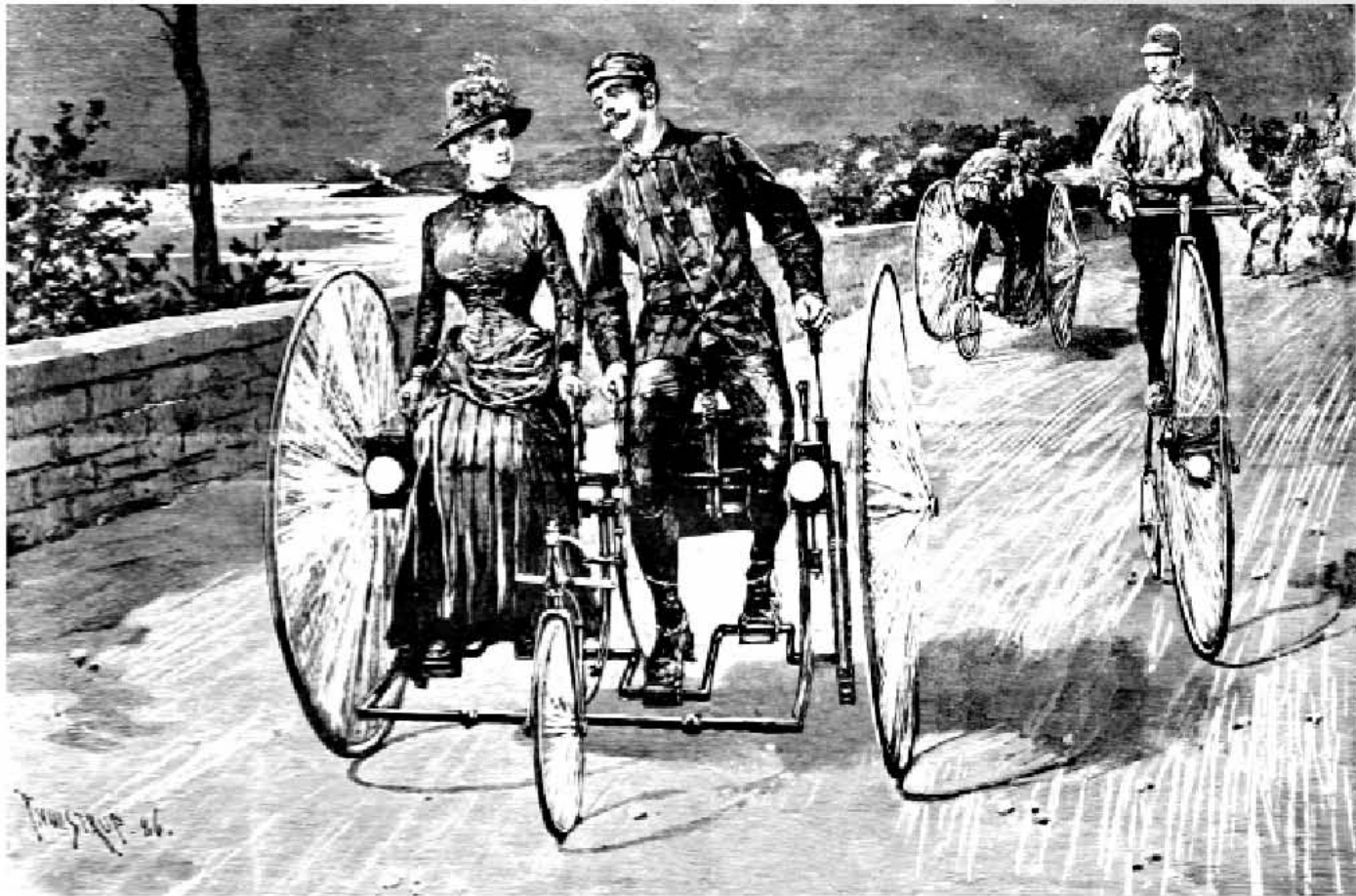
13. High wheeled Smith tricycle (1888)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_292.html

- Metal tubing frame. Wheels have metal rims with solid rubber tires.
- Diameter rear wheels: 40" front wheel: 25" Track of the rear wheels is 29" wide.
- The rear wheels are turned by leather straps wound on the clutches and attached to pedal levers. Springs rewind the straps when the pedal levers rise.
- The straps can be easily adjusted to provide two driving ratios.
- The rear wheels of the tricycle have separate axles.
- A wooden saddle mounted on springs - can be raised or lowered to suit the rider.
- A right hand brake connected to a friction brake that rubs against the tire on the front wheel
- A small metal mudguard is secured over the rear of the front wheel.


14. "Wheeling on Riverside Drive," from Harper's Weekly (1886)



12. This couple, photographed behind the White House in Washington, D.C., ride a tandem convertible quadricycle roadster of about 1885.




It could be converted into a single tricycle by separating it in the center, and detaching either the front or the rear portion.



While some people tried to modify the "Ordinary" to make it safer, others put their efforts into a major redesigning the bicycle. The second path won out as "Safety" bicycles became more popular.

New metal techniques allowed for chains small and strong enough to design bicycle with two small wheels of equal size, a chain driver, and gears. Soon after the advent of the Safety bicycle, John Boyd Dunlop patented a pneumatic tire (in both England and the United States). Brakes were also improved in the 1890s.





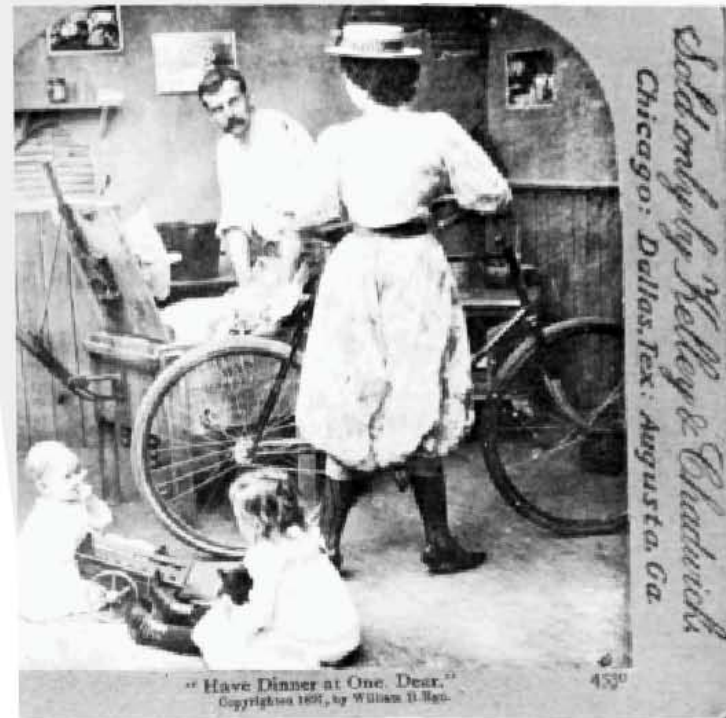
15. Woman's safety bicycle, Overman Victoria (1889)

- Front wheel: 28 inches diameter. Rear wheel: 28 inches.
- The frame is metal tubing, metal wheels with thin solid rubber.
- The leather saddle is on a coil spring and is adjustable vertically / front / back
- The rear-wheel sprocket is driven by a block chain from the front sprocket.
- There is no coaster attachment; the pedals are always turning while the bicycle is in motion.
- The front fork is designed to reduce shock.
- A small mudguard on rear of the front wheel. A large mudguard is over the rear wheel.
- A chain guard surrounds the chain and twine is laced in the mudguard to protect the rider's clothing from becoming entangled in the wheel spokes or the chain.
- Brakes on the handlebar controls, a rear wheel spoon brake by a system of wires and pivoted arms.

As bicycles became safer and more affordable, more women saw personal mobility as a route to personal freedom. In 1896, feminist Susan B. Anthony, said that bicycling had “done more to emancipate women than anything else in the world.”

Quote from: “Champion of Her Sex,” New York Sunday World, February 2 1896.

16. "Have Dinner at One, Dear."
Stereoscopic view,
from 1897, of liberation on
a bicycle - notice that she's
leaving with a man's bike!




17. Sheet music: New York and Coney Island Cycle March Two Step (1896)

The number of bicycles in use boomed as production rose from an estimated 200,000 bicycles in 1889 to 1,000,000 in 1899. By 1899, only a few dozen automobiles had been built, horses and carriages were expensive to maintain in crowded cities, and urban public transportation was slow.



The bicycle met the need for inexpensive individual transportation—just as the cars do today—for going to and from business, for business deliveries, for recreational riding, and for sport.



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Directly and indirectly, the bicycle had an influence on the development of the automobile. In addition to introducing thousands of persons to individual and independent mechanical transportation, the bicycle proved the value of many materials and parts that were later used by the automobile designers.

Ball bearings found one of their earliest uses in the bicycles of 1880 or earlier. The differential unit was employed in tricycles, and various forms of free-wheeling and gear-shifting devices were in use. Steel tubing, developed largely for cycle frame construction, was adopted by some early automobile builders. Pneumatic tires and wire wheels were also in use on bicycles prior to the introduction of the gasoline automobile in America.

...son woman's bicycle (1925)

19. Iver Johnson woman's bicycle (1925)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_308.html

- Frame - heavy steel tubing
- Hollow steel wheel rims are fitted with 28-by-1 1/2-inch Gillette inflatable single-tube tires. Each wheel has ball-bearing hubs.
- Coaster brake in the rear hub. Roller chain drive with nonadjustable pedal cranks.
- Handlebar grips are of black rubber. The saddle is fully adjustable.
- This cycle is equipped with front and rear mudguards, the rear one has a red reflector and holes through which a cord skirt guard is laced, a rear luggage rack, chain guard, and kick-stand.

As the 19th century closed, the bicycle industry began a rapid decline. Between 1900 and 1905 the number of bicycle manufacturers in the United States shrank from 312 to 101. Interest in the automobile was only partly responsible for this.

Other reasons for decline were a switch to other forms of recreation, and the fact that many electric railways took over the side paths originally constructed for bicycle use. For the next 50 years the bicycle was used mainly by children.

**18. Rochester NY, Main Street
(1903-1910?)**



From the Albert R. Stone Negative Collection, Rochester Museum & Science Center, Rochester, N.Y.

Adults use other new types of transportation. It's the era of the kid's bike!

Introduced by Schwinn in 1933, gave millions personal mobility, and appealed to their 1 automobiles and motorcycles. A typical streamlined styling, and a fake gasoline tank

http://americanhistory.si.edu/ONTHETOP/collection/object_00.html



icycle (1953)

http://americanhistory.si.edu/ONTHETOP/collection/object_00.html



with built-in kick-stand, "derailed" from one sprocket to ratios, and the pedal cranks have a chrome rim and carry 27" nylon

20. Snyder boy's bicycle (1927)

A metal toolbox is placed between the two horizontal sections of the frame. Under it hangs a metal container and battery for headlight.



http://americanhistory.si.edu/ONTHEMOVE/collection/object_309.html

- Tubular, diamond-shaped frame that weighs about 50 pounds.
- It has hollow steel wheel rims with 28" single-tube tires.
- Rear-wheel hub has a coaster brake. Both wheel hubs run on ball bearings.
- A hand-cranked horn is mounted on the brace.
- Adjustable saddle.
- Front and rear mudguards, a luggage rack over the rear guard, which carries a red glass reflector, and a stand are provided, but no chain guard is supplied.
- The bicycle is finished with orange and black paint and with nickel plate.

Balloon-tire bicycles for girls and boys, introduced by Schwinn in 1933, gave millions of young Americans the promise of personal mobility, and appealed to their imaginations with features that simulated automobiles and motorcycles. A typical model had long fenders, whitewall tires, streamlined styling, and a fake gasoline tank containing a battery-powered horn.

Mechanical features included internal-expanding brakes and shock-absorbing spring forks. Sales of children's balloon tire bicycles increased after World War II and remained strong until the late 1950s. Schwinn was an innovator and one of the largest makers of bicycles at the time.



http://americanhistory.si.edu/ONTHEMOVE/collection/object_90.html

21. Schwinn girl's Panther bicycle (1953)

22. Schwinn Varsity Tourist bicycle (1965)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_314.html

- Lightweight diamond pattern frame with built in kick-stand.
- 10-speed derailleur - the chain can be "derailed" from one sprocket to another, offering ten different gear ratios.
- The rear hub is fitted with five sprockets and the pedal cranks have two sprockets.
- Caliper brakes are used - front brake and rear.
- The 36-spoke wheels have tubular chrome rims and carry 27" nylon sports touring tires.

23. Schwinn Super Deluxe Sting-Ray bicycle (1965)



http://americanhistory.si.edu/ONTHEMOVE/collection/object_315.html

- Chrome-rimmed wheels with 20-inch whitewall tires, rear studded tire.
- The front wheel is mounted in a shock absorbing, spring-fork.
- The rear hub has a automatic 2-speed coaster brake, which is shifted from one speed to another by back-pedaling slightly, the brake works by back-pedaling more firmly.
- A chain guard protects the rider's clothing. High-rise handlebars.
- A white, padded "banana" seat adjusts to three different heights.
- Finished in a metallic sky-blue, chrome-plated fender and kick-stand.

Cycling
today



Photo: Peter Pappas



Photo: Flickr by kworth30



Photo: Peter Pappas



Photo: Flickr by David Barker Photographic

Since the late 1960's there's been new interest in cycling by people of all ages as an inexpensive, non-polluting form of travel, recreation and even deliveries. Bicycles continue to evolve - with new technical improvements, more specialized uses, and changing life-styles.



Photo: Peter Pappas



Photo: Flickr by c.miles

Unless otherwise noted, all text and images
from the Smithsonian Bike Collection